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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/863,224	05/24/2001	Ming-Hsing Tsai	TS00-563	9872

28112 7590 08/06/2003

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EXAMINER

BEREZNY, NEAL

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 08/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action

Application No.

09/863,224

Applicant(s)

TSAI ET AL.

Examiner

Neal Berezny

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--The MAILING DATE of this communication appears on the cover sheet with the corresponding address--

THE REPLY FILED 10 June 2003 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

- a) ☐ The period for reply expires _____ months from the mailing date of the final rejection.
- b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
- ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on _____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.
2. ☒ The proposed amendment(s) will not be entered because:
- (a) ☒ they raise new issues that would require further consideration and/or search (see NOTE below);
 - (b) ☐ they raise the issue of new matter (see Note below);
 - (c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
 - (d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____

3. ☒ Applicant's reply has overcome the following rejection(s): 112.
4. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
5. ☐ The a) ☐ affidavit, b) ☐ exhibit, or c) ☒ request for reconsideration has been considered but does NOT place the application in condition for allowance because: see advisory action.
6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.
7. ☒ For purposes of Appeal, the proposed amendment(s) a) ☒ will not be entered or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: _____

Claim(s) objected to: _____

Claim(s) rejected: 1-30Claim(s) withdrawn from consideration: 31-33

8. ☐ The proposed drawing correction filed on _____ is a) ☐ approved or b) ☐ disapproved by the Examiner.
9. ☐ Note the attached Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
10. ☐ Other: _____

ADVISORY ACTION

1. The amendment filed 6/10/03 under 37 CFR 1.116 in reply to the final rejection has been considered but is not deemed to place the application in condition for allowance and will not be entered because it raises new issues and/or requires the examiner to conduct an additional search.
2. Applicant's proposed amendment would overcome the examiner's 112 rejection of claims 8 and 25.
3. Applicant's attention is directed to claim 13, where arguments are made referring to changes that are found neither in the clean copy nor the marked-up copy.

Response to Arguments

4. Applicant's arguments filed 6/10/03 have been fully considered but they are not persuasive. On page 11 of the response, applicant asserts that Zhou fails to teach the formation of SiO_2 in forming a protection layer. Applicant's attention is directed to col.8, ln.5-20, which further elaborates on the reaction chemistry. Note that the sulfur containing gases consist of SO_2 and SO_3 and further include oxygen gas. During the sulfating and sulfonating reactions the oxygen will react with any available silicon atoms, thus form SiO_2 as claimed. The net result is that the sulfur-containing layer **inherently** also contains silicon dioxide. Applicant also argues that there are no silicon atoms present in the Zhou structure. Applicant's attention is directed to col.4, ln.24-46, which teaches the use of hydrogen-doped and carbon-doped silicon dioxide. Both hydrogen and carbon doping inherently contain silicon-hydrogen and silicon-carbon bonds, which

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would be broken in the presence of oxygen, forming silicon dioxide and by-products of water and carbon dioxide. Further, the formation of silicon dioxide by the prior art provides the claimed structure and function claimed, even if not explicitly expressed in the reference.

5. Applicant argues that Zhou performs applicant's two steps simultaneously, but applicant's claims fail to require separate steps. A simultaneous step is within the scope of the claims. Further, applicant's assertion of a relevant amendment to claim 13, is unsupported.

6. Applicant also argues that Zhou teaches two protective coatings, while applicant teaches just one. **Applicant's** claims use the term "comprising", which broadens the scope of **applicant's** claims to include extra steps and layers. Further, it is still possible to form the claimed barrier layer in the vias and trenches, even with the use of resist.

7. Applicant asserts that Lin teaches a barrier layer 100 to 2000 angstroms, while the claimed invention only claims 30-500 angstroms. The ranges overlap and therefore the claimed invention infringes on Lin.

8. Applicant attacks the Lin reference asserting that Lin does not teach the etching of low-K dielectrics, but rather silicon oxide and nitride. Applicant further asserts that

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the claimed recipe "would be of no use to Lin". Applicant's attention is directed to applicant's claim 19 and 24, which teach applicant's claimed recipe is used to etch an etch stop layer, which is claimed to consist of silicon nitride. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicant's assert that Lin does not teach the claimed gas components because Lin does not etch low-k materials. Such reasoning is flawed and incorrect because it uses allegedly different applications of the etch gases to deny the existence of the etch gases. Furthermore, applicant's attention is directed to the fact that porous oxides and nitrides are considered to be low-k dielectrics. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention to use the same etch chemistry to etch oxides and nitrides, as to etch porous oxides and porous nitrides.

9. Applicant asserts that the instant application predates Eissa, which is incorrect because Eissa has priority back to Nov. 20, 2000. Finally, applicant asserts that Eissa teaches the use of commercial low-k dielectric products, which are well known in the art, thus not teaching anything new. The cited art is used in the rejection to merely assert that the use of a low-k dielectric with a value between 2 and 3, is known and would be obvious. Applicant's arguments seem to be confirming the examiner's assertion.

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Conclusion

10 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Neal Berezny whose telephone number is (703) 305-1481. The examiner can normally be reached on M-F 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

NB
July 31, 2003



Olik Chaudhuri
Supervisory Patent Examiner
Technology Center 2800